



Photo courtesy Victor Sotelo

May 21, 1975 - D/V *Glomar Challenger* entered the Bosphorus Harbor from the Sea of Marmara at the end of DSDP Leg 42A in the Mediterranean and preparatory to anchoring for a scientific crew change to begin DSDP Leg 42B in the Black Sea.

The ship is approaching the Bosphorus Bridge which connects the European sector of Istanbul with the Asian sector. Completed in 1973, it is proudly referred to as Turkey's "Golden Gate". The central and major span of the bridge is 3,500 feet long and it stands 203 feet above mean sea level. The *Challenger* cleared it by a mere 7 feet.

# Initial Reports of the Deep Sea Drilling Project

---

A Project Planned by and Carried Out With the Advice of the  
JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES)

---

## Volume XLII

### Part 2

covering Leg 42, Part 2, of the cruises of the Drilling Vessel *Glomar Challenger*  
Istanbul, Turkey to Istanbul, Turkey  
May-June 1975

---

#### PARTICIPATING SCIENTISTS

David A. Ross, Yuri P. Neprochnov,  
Kenneth J. Hsü, Peter Stoffers, Peter Supko, Egis S. Trimonis,  
Stephen F. Percival, Jr., Albert J. Erickson, Egon T. Degens,  
John M. Hunt, Frank T. Manheim, Muhittin Senalp, Alfred Traverse

#### SCIENCE EDITORS

John L. Usher and Peter Supko

Prepared for the  
NATIONAL SCIENCE FOUNDATION  
National Ocean Sediment Coring Program  
Under Contract C-482

By the  
UNIVERSITY OF CALIFORNIA  
Scripps Institution of Oceanography  
Prime Contractor for the Project

This material is based upon research supported by the National Science Foundation under Contract No. C-482.

Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

*References to this Volume:*

It is recommended that reference to whole or part of this volume be made in one of the following forms, as appropriate:

Ross, D. A., Neprochnov, Y. P., et al., 1978. Initial Reports of the Deep Sea Drilling Project, Volume 42, Part 2: Washington (U.S. Government Printing Office).

Stoffers, P., Degens, E. T., and Trimonis, E. S., 1978. Stratigraphy and suggested ages of Black Sea sediments cored during Leg 42B. *In* Ross, D. A., Neprochnov, Y. P., et al., 1978. Initial Reports of the Deep Sea Drilling Project, Volume 42, Part 2: Washington (U.S. Government Printing Office), p. 483-488.

Printed: April 1978

**Library of Congress Catalog Card Number 74-603338**

---

For sale by the Superintendent of Documents, U.S. Government Printing Office  
Washington, D.C. 20402 - Price \$35.75 for two part set  
Stock Number 038-000-00358-0

# Foreword

For the three and one-half years between 1872 and 1876, the H.M.S. CHALLENGER—after which D/V GLOMAR CHALLENGER is named—undertook the world's first major oceanographic expedition. It is fitting that our century should have its counterpart to that famous ship a century ago whose voyages helped established oceanography as a science. It is equally fitting that GLOMAR CHALLENGER should be plying the same waters one century later seeking answers to new questions concerning the history of our planet and the life it supports. The fundamental advancement of our knowledge of the earth will lead to enhanced capabilities to understand its processes and to use its natural resources intelligently.

The Deep Sea Drilling Project is being undertaken within the context of the National Science Foundation's Ocean Sediment Coring Program. The Foundation is funding the project by means of a contract with the University of California, and the Scripps Institution of Oceanography is responsible for its management. The University has, in turn, subcontracted with Global Marine Incorporated for the services of the drilling ship, GLOMAR CHALLENGER.

Scientific planning is conducted under the auspices of the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). The JOIDES consortium has convened advisory panels for that purpose, consisting of a large number of distinguished scientists from the academic institutions, Government agencies, and private industry of many countries. Altogether, the project has involved the active interest and participation of many of the world's best scientists and technologists.

The first ocean coring operations for the Deep Sea Drilling Project began on August 11, 1968. During the ensuing years of drilling operations in the Atlantic, Pacific, and Indian Oceans, the Gulf of Mexico, Caribbean Sea, and Mediterranean Sea, and Antarctic waters, the scientific objectives that had been set forth were successfully accomplished. Primarily, the age of the ocean basins and their processes of development were determined. Emphasis was placed on broad reconnaissance and on testing the involvement of the mid-oceanic rise systems in the development of the ocean basins.

From these concepts come major interpretations of the results of the drilling as they bear on patterns of sedimentation and physical and chemical characteristics of the ancient oceans.

As a result of the success of the Deep Sea Drilling Project, the National Science Foundation extended its contract with the University of California to encompass an additional 36 months of drilling, allowing GLOMAR CHALLENGER to continue operations throughout the oceans of the world in exploring the deep ocean floors for a period presently extending one full decade. Scientific interest will involve major effort in drilling deeply into the oceanic crustal igneous rocks to study the processes and mechanisms leading to the formation of the oceanic crust.

These reports contain the results of initial studies of the recovered core material and the associated geophysical information. The contribution to knowledge has been exceedingly large and future studies of the core material over many years will contribute much more.

The importance of the work of the Deep Sea Drilling Project and D/V GLOMAR CHALLENGER is internationally recognized. In response to this recognition, a number of nations are providing partial support. Effective January 1974, the USSR and the Federal Republic of Germany entered into agreements with the United States for participation and support. Similar arrangements were agreed to by Japan in July 1975, the United Kingdom in September 1975, and France in January 1976.

All people, in their lives, activities, and industry, should benefit greatly from the project—from the technological advances that are being made and through the information being obtained on natural resources.



Richard C. Atkinson  
*Director*

Washington, D. C.  
October 1976

## Preface

Recognizing the need in the oceanographic community for scientific planning of a program to obtain deep sedimentary cores from the ocean bottoms, four of the major oceanographic institutions that had strong interests and programs in the fields of marine geology and geophysics, formed in May 1964, the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). This group, Lamont-Doherty Geological Observatory; Rosenstiel School of Marine and Atmospheric Science, University of Miami; the Scripps Institution of Oceanography, University of California at San Diego; and the Woods Hole Oceanographic Institution, expressed an interest in undertaking scientific planning and guidance of the sedimentary drilling program. It was the purpose of this group to foster programs to investigate the sediments and rocks beneath the deep oceans by drilling and coring. The membership of this original group was later enlarged in 1968 when the University of Washington became a member, and again in 1975 when University of Hawaii Institute of Geophysics, the Oregon State University School of Oceanography, the University of Rhode Island Graduate School of Oceanography, and Texas A&M University Department of Oceanography became members.

Through discussions sponsored by the JOIDES organization, with support from the National Science Foundation the Lamont-Doherty Geological Observatory operated a drilling program with Dr. J. Lamar Worzel as Principal Investigator. This successful drilling effort early in the summer of 1965, on the Blake Plateau region off Jacksonville, Florida, used the drilling vessel, *Caldrill I*.

With this success in hand, planning began for a more extensive deep sea effort. This resulted in the award of a contract by the National Science Foundation to the University of California for an eighteen-month drilling program in the Atlantic and Pacific Oceans, termed the Deep Sea Drilling Project. Operations at sea began in August 1968.

The goal of the Deep Sea Drilling Project is to gather scientific information that will help determine the age and processes of development of the ocean basins. The primary strategy is to drill deep holes into the ocean floor, relying largely on technology developed by the petroleum industry.

Through the efforts of these five principal organizations and of the panel members which were drawn from a large cross section of leading earth scientists and associates, a scientific program was developed.

Cores recovered from deep beneath the ocean floor will provide reference material for a multitude of future studies in fields such as biostratigraphy, physical stratigraphy, and paleomagnetism, that will afford a new scope for studies of the physical and chemical aspects of sediment provenance, transportation, deposition, and diagenesis. In-hole measurements, as feasible, should provide petrophysical data to permit inference of lithology of intervals from which no cores were recovered.

A report, describing the core materials and information obtained both at sea and in laboratories on shore, is published as soon as possible after the completion of each cruise. These reports are a cooperative effort of the scientists participating in the cruise and are intended primarily to be a compilation of results which, it is hoped, will be the starting point for many future new and exciting research programs. Preliminary interpretations of the data and observations taken at sea, are also included.

Core materials and data collected on the cruise will be made available to qualified scientists through the Curator of the Deep Sea Drilling Project, following a Sample Distribution

Policy (p. xvii) approved by the National Science Foundation.

The advent of *Glomar Challenger*, with its deep-water drilling ability, is exceedingly timely. It has come when geophysical investigation of the oceans has matured through 20 to 30 years of vigorous growth to the point where we have some knowledge about much of the formerly unknown oceanic areas of our planet. About one million miles of traverses had been made which tell us much about the global pattern of gravity, magnetic and thermal anomalies, and about the composition, thickness and stratification of the sedimentary cover of the deep-sea and continental margin. The coverage with such data has enabled the site selection panels to pick choice locations for drilling. The knowledge gained from each hole can be extended into the surrounding area. Detailed geophysical surveys were made for most of the selected locations prior to drilling.

The earth sciences have recently matured from an empirical status to one in which substantial theories and hypotheses about major tectonic processes are flourishing. Theories about the origin of magnetic fields and magnetic reversals, about ocean floor spreading and continental drift, and about the thermal history of our planet, have led to specific predictions that could be tested best by an enlightened program of sampling of deep-sea and continental margin sediments and underlying rocks.

The members of JOIDES and the scientists from all interested organizations who have served on the various advisory panels are proud to have been of service to the Nation and believe that the information and core materials that have been obtained will be of value to students of earth sciences and all humanity for many years to come.

# Deep Sea Drilling Project

## **MEMBER ORGANIZATIONS OF THE JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES):\***

Bundesanstalt für Geowissenschaften and Rohstoffe,  
Federal Republic of Germany

Lamont-Doherty Geological Observatory, Columbia  
University

Rosenstiel School of Marine and Atmospheric  
Science, University of Miami

Scripps Institution of Oceanography, University of  
California

USSR Academy of Sciences

University of Washington

Woods Hole Oceanographic Institution

## **OPERATING INSTITUTION:**

W. A. Nierenberg, Director  
Scripps Institution of Oceanography  
University of California at San Diego  
La Jolla, California

## **DEEP SEA DRILLING PROJECT**

N. T. Edgar  
Project Chief Scientist

M. N. A. Peterson  
Principal Investigator and Project Manager

\* Includes member organizations during time of the  
cruise.

## **SENIOR PROJECT PERSONNEL**

Mr. Frank C. MacTernan  
Principal Engineer and  
Deputy Project Manager

Dr. David G. Moore  
Chief Scientist

Dr. Stan M. White  
Associate Chief Scientist for  
Science Operations

Dr. John L. Usher  
Associate Chief Scientist for  
Science Services

Mr. William R. Riedel  
Curator

Mr. Stanley T. Serocki  
Project Development Engineer

Mr. Valdemar Larson  
Operations Manager

Mr. William T. Soderstrom  
Finance Administrator

Mr. Robert Olivas  
Logistics Officer

Mr. Robert S. Bower  
Contracts Officer

Ms. Sue Strain  
Personnel Officer

## Participants Aboard

### GLOMAR CHALLENGER for Leg Forty Two Part 2:

Dr. David A. Ross  
Co-Chief Scientist  
*Woods Hole Oceanographic  
Institution  
Woods Hole, Massachusetts 02453*

Dr. Yuri P. Neprochnov  
Co-Chief Scientist  
*P. P. Shirshov Institute of  
Oceanology  
USSR Academy of Sciences  
1, Letnyaya, Lublino  
Moscow, 109387  
USSR*

Dr. Kenneth J. Hsü  
Sedimentologist  
*Eidg. Technisches Hochschule  
Geologisches Institut  
Sonneggstrasse 5  
CH-8006 Zurich  
Switzerland*

Dr. Peter Stoffers  
Sedimentologist  
*Institut Sedimentforschung  
Universitat Heidelberg  
Postfach 103020  
D-69 Heidelberg 1  
Federal Republic of Germany*

Dr. Peter Supko  
Sedimentologist/Editorial  
Representative  
*Deep Sea Drilling Project  
Scripps Institution of Oceanography  
La Jolla, California 92093*

Dr. Egis S. Trimonis  
Sedimentologist  
*P. P. Shirshov Institute of  
Oceanology  
USSR Academy of Sciences  
1, Prospekt Mira  
Kaliningrad  
USSR*

Dr. Stephen F. Percival, Jr.  
Paleontologist/Nannofossils  
*Mobil Oil Corporation  
P. O Box 900  
Dallas, Texas 75221*

Dr. Albert J. Erickson  
Heat Flow Specialist  
*Department of Geology  
University of Georgia  
Athens, Georgia 30602*

Dr. Egon T. Degens  
Geochemist  
*Geological-Paleontological Institute  
E.T.D. 2 Hamburg 13  
Von Melle Park 11  
Federal Republic of Germany*

Dr. John M. Hunt  
Geochemist  
*Woods Hole Oceanographic  
Institution  
Woods Hole, Massachusetts 02543*

Dr. Frank T. Manheim  
Geochemist  
*University of South Florida  
Division of Marine Sciences  
St. Petersburg, Florida 33701*

Dr. Muhittin Senalp  
Sedimentologist  
*MTA Petrol  
Subesi, Ankara  
Turkey*

Dr. Alfred Traverse  
Palynologist  
*The Pennsylvania State University  
College of Earth and Mineral  
Sciences  
University Park, Pennsylvania 16802*

Mr. M. D. Pennock  
Cruise Operations Manager  
*British Petroleum Company Limited  
Britannic House — Moore Lane  
London EC2Y 9BU  
United Kingdom*

Mr. Melvin Fields  
Weatherman  
*NOAA  
National Weather Service  
East Coast Weather Patrol  
439 West York Street  
Norfolk, Virginia 23510*



Captain Joseph A. Clarke  
Captain of the Drilling Vessel  
*Global Marine, Inc.*  
*Los Angeles, California 90017*

Mr. James Ruddell  
Drilling Superintendent  
*Global Marine, Inc.*  
*Los Angeles, California 90017*

Mr. Gerald W. Bode  
Laboratory Officer  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Victor Sotelo  
Chemist  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Robert Byrne  
Electronics Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Craig Dootson  
Marine Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

M. James Pine  
Marine Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. William Brennan  
Marine Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Stanley C. St. John  
Marine Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Ms. Patricia Paluso  
Paleontological Preparation Technician  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Leonard Lawrence Lauve  
Photographer  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Ms. Catherine Ogle  
Yeoman  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

Mr. Burt Adams  
Test Engineer (Leg 42, Part 2 only)  
*Deep Sea Drilling Project*  
*Scripps Institution of Oceanography*  
*La Jolla, California 92093*

## Deep Sea Drilling Project Publications Staff

Dr. Ansis G. Kaneps  
Science Editor

Ms. Paula Worstell  
Science Editor

Mr. James Shambach  
Science Editor

Mr. Ray Silk  
Production Manager

Ms. Virginia L. Roman  
Art Supervisor

Mr. Fred Laughter  
Science Editor

Ms. Mary A. Young  
Production Coordinator

Ms. Janice E. Bowman  
Production Coordinator

## JOIDES Advisory Groups\*

### Executive Committee

- Dr. Manik Talwani  
*Lamont-Doherty Geological Observatory*
- Dr. Warren S. Wooster  
*Rosensteil School of Marine and  
Atmospheric Science*
- Dr. William A. Nierenberg  
*Scripps Institution of Oceanography*
- Dr. Arthur E. Maxwell  
*Woods Hole Oceanographic Institution*
- Dr. Maurice Rattray  
*University of Washington*
- Academician Andrie S. Monin  
*P. P. Shirshov Institute of Oceanology*
- Prof. Dr. F. Bender  
*Bundesanstalt für Bodenforschung*
- Dr. Hans Closs \*\*  
*Bundesanstalt für Bodenforschung*
- Mr. John I. Ewing  
*Lamont-Doherty Geological Observatory*
- Dr. Paul M. Fye  
*Woods Hole Oceanographic Institution*
- Dr. Charles J. Merdinger  
*Scripps Institution of Oceanography*
- Dr. Gleb Udintsev  
*P. P. Shirshov Institute of Oceanology*
- Dr. Melvin N. A. Peterson (Ex-Officio)  
*Scripps Institution of Oceanography*
- Dr. John V. Byrne  
*Oregon State University*
- Monsieur Jacques Debysier  
*CNEXO*
- Dr. Richard A. Geyer  
*Texas A&M University*
- Sir Peter Kent, F.R.S.  
*Natural Environment Research Council*
- Dr. John A. Knauss  
*University of Rhode Island*
- Monsieur Yves La Prairie  
*CNEXO*
- Captain T. K. Treadwell  
*Texas A&M University*
- Dr. P. R. Twinn  
*Natural Environment Research Council*

\* Includes members during time of Leg 36  
(April-May 1974)

\*\* Alternate

- Dr. Seiitiro Utida  
*Ocean Research Institute  
University of Tokyo*
- Dr. Norman D. Watkins  
*University of Rhode Island*
- Dr. George P. Woollard  
*Hawaii Institute of Geophysics*

### Planning Committee

- Mr. John I. Ewing  
*Lamont-Doherty Geological Observatory*
- Dr. William W. Hay  
*Rosensteil School of Marine and  
Atmospheric Science*
- Dr. Joe S. Creager  
*University of Washington*
- Mr. William R. Riedel  
*Scripps Institution of Oceanography*
- Dr. James R. Heirtzler  
*Woods Hole Oceanographic Institution*
- Dr. Gleb Udintsev  
*P. P. Shirshov Institute of Oceanology*
- Dr. Hans Closs  
*Bundesanstalt für Bodenforschung*
- Dr. N. Terence Edgar (Ex-Officio)  
*Scripps Institution of Oceanography*
- Dr. George Shor  
*Scripps Institution of Oceanography*
- Dr. Helmut Beiersdorf  
*Bundenstalt für Geowissenschaften  
und Rohstoffe*
- Dr. Arnold Bouma  
*Texas A&M University*
- Dr. William Bryant  
*Texas A&M University*
- Dr. C. G. A. Harrison  
*Rosensteil School of Marine and  
Atmospheric Science*
- Dr. Dennis E. Hayes  
*Lamont-Doherty Geological Observatory*
- Dr. James Kennett  
*University of Rhode Island*
- Dr. LaVern D. Kulm  
*Oregon State University*
- Dr. Yves Lancelot  
*CNEXO*
- Dr. Anthony S. Laughton  
*Institute of Oceanographic Sciences*

Dr. Xavier Le Pichon  
*CNEXO*

Dr. Dean A. McManus  
*University of Washington*

Dr. Noriyuki Nasu  
*Ocean Research Institute*

Dr. Jean-Guy Schilling  
*University of Rhode Island*

Dr. Tj. H. VanAndel  
*Oregon State University*

Dr. George P. Woollard  
*Hawaii Institute of Geophysics*

#### **Atlantic Advisory Panel**

Mr. John I. Ewing  
*Lamont-Doherty Geological Observatory*

Dr. William A. Berggren  
*Woods Hole Oceanographic Institution*

Dr. Dennis E. Hayes  
*Lamont-Doherty Geological Observatory*

Dr. Xavier Le Pichon  
*Centre National pour l'Exploitation  
des Océans*

Dr. Kenneth S. Deffeyes  
*Princeton University*

Dr. Anthony S. Laughton  
*Institute of Oceanographic Sciences*

Dr. Fabrizio Aumento  
*Dalhousie University*

Dr. Enrico Bonatti  
*Rosenstiel School of Marine and  
Atmospheric Science*

Dr. Gleb Udintsev  
*P. P. Shirshov Institute of Oceanology*

Dr. Karl Hinz  
*Bundesanstalt für Bodenforschung*

Dr. Charles D. Hollister  
*Woods Hole Oceanographic Institution*

Dr. Ulrich von Rad  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

#### **Mediterranean Advisory Panel**

Dr. Kenneth J. Hsü  
*Geologisches Institut der E.T.H.*

Dr. William B. F. Ryan  
*Lamont-Doherty Geological Observatory*

Dr. Enrico Bonatti  
*Rosenstiel School of Marine and  
Atmospheric Science*

Dr. David A. Ross  
*Woods Hole Oceanographic Institution*

Dr. Maria Bianca Cita  
*University of Milano*

Dr. Lucien Montadert  
*Institut Français du Pétrole*

Dr. Frank H. Fabricius  
*Technische Universität München*

Dr. Hans Closs  
*Bundesanstalt für Bodenforschung*

#### **Antarctic Advisory Panel**

Dr. Dennis E. Hayes  
*Lamont-Doherty Geological Observatory*

Dr. Robert H. Rutford  
*University of Nebraska*

Dr. James P. Kennett  
*University of Rhode Island*

Dr. Ian W. D. Dalziel  
*Lamont-Doherty Geological Observatory*

Dr. David W. Scholl  
*United States Geological Observatory*

Dr. James R. Heirtzler  
*Woods Hole Oceanographic Institution*

Dr. William G. Melson  
*Smithsonian Institution*

Dr. Peter Barker  
*University of Birmingham*

Dr. David J. W. Piper  
*Dalhousie University*

Prof. A. P. Lisitzin  
*P. P. Shirshov Institute of Oceanology*

Dr. A. V. Zhivago  
*P. P. Shirshov Institute of Oceanology*

#### **Advisory Panel on Igneous and Metamorphic Petrography**

Dr. Ian D. MacGregor  
*University of California at Davis*

Dr. Nikolas I. Christensen  
*University of Washington*

Dr. Leonid Dmitriev  
*USSR Academy of Sciences*

Dr. Frederick A. Frey  
*Massachusetts Institute of Technology*

Dr. Stanley R. Hart  
*Carnegie Institution of Washington*

Dr. James R. Heirtzler  
*Woods Hole Oceanographic Institution*

Dr. William G. Melson  
*Smithsonian Institution*

Dr. Akiho Miyashiro  
*State University of New York at Albany*

Dr. H. U. Schmincke  
*Ruhr-Universität Bochum*

Dr. Tracy Vallier (Ex-Officio)  
*Scripps Institution of Oceanography*

Dr. W. Schreyer  
*Ruhr-Universität Bochum*

**Advisory Panel on Sedimentary Petrology  
and Physical Properties**

Dr. George H. Keller  
*NOAA Atlantic Oceanographic and  
Meteorological Laboratories*

Dr. Edwin L. Hamilton  
*Naval Undersea Research Center*

Dr. Alexander P. Lisitzin  
*USSR Academy of Sciences*

Prof. Dr. G. Müller  
*Laboratorium für Sedimentforschung,  
Heidelberg*

Dr. Adrian P. Richards  
*Lehigh University*

Dr. Nahum Schneidermann  
*Gulf Research and Development  
Company*

Dr. Tjeerd H. Van Andel  
*Oregon State University*

Dr. John T. Whetten  
*University of Washington*

Dr. Joe S. Creager  
*University of Washington*

Dr. Harry E. Cook  
*United States Geological Survey*

Dr. Alfred G. Fischer  
*Princeton University*

Mr. Henry L. Gill  
*Naval Civil Engineering Laboratory*

**Advisory Panel on Paleontology and  
Biostratigraphy**

Dr. William Berggren  
*Woods Hole Oceanographic Institution*

Dr. C. W. Drooger  
*University of Utrecht*

Dr. William W. Hay  
*Rosenstiel School of Marine and  
Atmospheric Science*

Dr. Eric G. Kauffman  
*Smithsonian Institution*

Dr. Valeri Krasheninnikov  
*USSR Academy of Sciences*

Dr. Helen Loeblich  
*University of California at Los Angeles*

Dr. Emile A. Pessagno  
*University of Texas at Dallas*

Dr. Tsunemasa Saito  
*Lamont-Doherty Geological Observatory*

Dr. Maria G. Petrushevskaya  
*USSR Academy of Sciences*

Dr. Alan Shaw  
*Amoco Production Company*

Dr. Hans-Joachim Schrader  
*University of Kiel*

Dr. Reinhart Wolfart  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

**Advisory Panel on Organic Geochemistry**

Dr. Keith A. Kvenvolden  
*NSAS Ames Research Center*

Dr. Earl W. Baker  
*Northeast Louisiana University*

Dr. Ellis E. Bray  
*Mobil Oil Company*

Dr. N. A. Eremenko  
*Institute of Geology and Exploration of  
Combustible Mineral Resources*

Dr. William W. Hay  
*Rosenstiel School of Marine and  
Atmospheric Science*

Dr. Richard D. McIver  
*Esso Production Research Laboratory*

Dr. John M. Hunt  
*Woods Hole Oceanographic Institution*

Dr. J. Gordon Erdman  
*Phillips Petroleum Company*

Dr. Erwin Suess  
*Oregon State University*

Dr. A. A. Geodekjan  
*P. P. Shirshov Institute of Oceanology, USSR*

Dr. Dietrich Welte  
*Lehrstuhl für Geologie, Geochemie, und  
Lagerstätten des Erdöls und der Kohle  
Rhein-West. Techn. Hochschule*

**Advisory Panel on Information Handling**

Dr. Melvin A. Rosenfeld  
*Woods Hole Oceanographic Institution*

Dr. Daniel W. Appleman  
*Smithsonian Institution*

Dr. Jack G. Barr  
*Standard Oil Company of California*

Dr. James C. Kelley  
*University of Washington*

Dr. Peter R. Supko  
*Scripps Institution of Oceanography*

Mr. William R. Riedel  
*Scripps Institution of Oceanography*

Dr. I. Mikhaltsev  
*P. P. Shirshov Institute of Oceanology*

Dr. T. A. Davies (Ex Officio)  
*Middlebury College*

Dr. H. Glashoff  
*Bundesanstalt für Geowissenschaften und Rohstoffe*  
Professor L. Sitnikov  
*Academy of Sciences of the USSR*

**Advisory Panel on Pollution Prevention  
and Safety**

Dr. Hollis D. Hedberg  
*Princeton University*  
Mr. John I. Ewing  
*Lamont-Doherty Geological Observatory*  
Dr. Louis E. Garrison  
*United States Geological Survey*  
Dr. Manik Talwani  
*Lamont-Doherty Geological Observatory*  
Dr. Dennis E. Hayes  
*Lamont-Doherty Geological Observatory*  
Mr. Oscar Weser  
*Scripps Institution of Oceanography*  
Dr. John E. Sherborne \*\*\*  
*Union Oil Company of California*  
Dr. H. Grant Goodell  
*University of Virginia*  
Dr. E. L. Winterer  
*Scripps Institution of Oceanography*

**Advisory Panel on Inorganic Geochemistry**

Dr. Heinrich D. Holland  
*Hoffman Laboratory*  
Dr. Wallace S. Broecker  
*Lamont-Doherty Geological Observatory*  
Mr. John I. Ewing  
*Lamont-Doherty Geological Observatory*  
Dr. Joris M. Gieskes  
*Scripps Institution of Oceanography*  
Dr. Ian R. Kaplan  
*University of California at Los Angeles*  
Dr. Frank T. Manheim  
*University of South Florida*  
Dr. Karl K. Turekian  
*Yale University*  
Dr. Igor M. Varentsov  
*The USSR Academy of Sciences*  
Dr. Gleb N. Baturin  
*The USSR Academy of Sciences*  
Dr. Erwin Suess  
*Oregon State University*  
Dr. K. H. Wedepohl  
*Geochemisches Institut der Universität/Göttingen*

**Industrial Liaison Panel**

Mr. W. A. Roberts  
*Phillips Petroleum Company*  
Mr. Fred C. Ackman  
*Esso Exploration Inc.*  
Mr. Melvin J. Hill  
*Gulf Oil Corporation*  
Mr. John D. Moody  
*Mobil Oil Corporation*

**Advisory Panel on Ocean Crust**

Dr. William G. Melson  
*Smithsonian Institution*  
Dr. Leonid Dmitriev  
*Institute of Geochemistry, USSR*  
Dr. Stanley R. Hart  
*Carnegie Institution of Washington*  
Dr. James R. Heirtzler  
*Woods Hole Oceanographic Institution*  
Dr. Ian D. MacGregor  
*University of California at Davis*  
Dr. Manik Talwani  
*Lamont-Doherty Geological Observatory*  
Dr. W. Jason Morgan  
*Princeton University*  
Dr. Hans Schmincke  
*Ruhr-Universität Bochum*  
Dr. Werner Schreyer  
*Ruhr-Universität Bochum*  
Dr. John C. Sclater  
*Massachusetts Institute of Technology*  
Dr. Nikolas Christensen  
*University of Washington*  
Dr. Gleb Udintsev  
*P. P. Shirshov Institute of Oceanology, USSR*

**Advisory Panel on Ocean Margin (Active)**

Dr. Seiya Uyeda  
*Lamont-Doherty Geological Observatory*  
Dr. Joe S. Creager  
*University of Washington*  
Dr. I. P. Kosminskaya  
*Institute of the Physics of the Earth, USSR*  
Dr. Loren W. Kroenke  
*University of Hawaii*  
Dr. Creighton A. Burk  
*Mobile Oil Corporation  
Princeton, New Jersey*  
Dr. William J. Ludwig  
*Lamont-Doherty Geological Observatory*  
Dr. Gordon Packham  
*University of Sydney*

\*\*\* Deceased

Academician A. P. Pieve  
*Institute of Geology, USSR*

Dr. David W. Scholl  
*U.S. Geological Survey*

Dr. Roland Von Huene  
*U.S. Geological Survey*

#### **Advisory Panel on Ocean Margin (Passive)**

Dr. Joseph R. Curry  
*Scripps Institution of Oceanography*

Dr. A. W. Bally  
*Shell Oil Company*

Academician V. V. Belousov  
*Soviet Geophysical Committee*

Professor Daniel Bernoulli  
*Geologisch-Palaontologisches Institut, Basel*

Professor Dr. Hans Closs  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

Mr. John Ewing  
*Lamont-Doherty Geological Observatory*

Dr. K. Hinz  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

Dr. Lucien Montadert  
*Institut Français du Pétrole*

Mr. David G. Roberts  
*Institute of Oceanographic Sciences*

Dr. E. Seibold  
*Geologisch-Palaontologisches Institut, Universität-Kiel*

Dr. Von Stackleberg  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

#### **Advisory Panel on Ocean Paleoenvironment**

Professor Hans M. Bolli  
*Technische Hochschule, Zurich*

Dr. Thomas A. Davies  
*Scripps Institution of Oceanography*

Mr. Jacques Debyser  
*CNEXO, Paris*

Dr. William W. Hay  
*Rosenstiel School of Marine & Atmospheric Science*

Dr. Valeri A. Krasheninnikov  
*Geological Institute, USSR*

Dr. Alexander Lisitzin  
*P. P. Shirshov Institute of Oceanology, USSR*

Dr. James Kennett  
*University of Rhode Island*

#### **Advisory Panel on Site Surveying**

Dr. Brian T. R. Lewis  
*University of Washington*

Dr. Mahlon Ball  
*Rosenstiel School of Marine & Atmospheric Science*

Dr. Elizabeth Bunce  
*Woods Hole Oceanographic Institution*

Dr. Edgar S. Driver  
*Gulf Global Exploration Company*

Mr. John Ewing  
*Lamont-Doherty Geological Observatory*

Dr. Karl Hinz  
*Bundesanstalt für Geowissenschaften und Rohstoffe*

Dr. Donald M. Hussong  
*Hawaii Institute of Geophysics*

Dr. L. Kogan  
*Southern Branch of the Institute of Oceanology, USSR*

Dr. Isabella Premoli-Silva  
*University of Milano*

Mr. William R. Riedel  
*Scripps Institution of Oceanography*

Dr. H.-J. Schrader  
*Geologisch-Palaontologisches  
Institut der Universität Kiel*

Dr. Tj. H. Van Andel  
*Oregon State University*

Professor Thomas J. Worsley  
*University of Washington*

Dr. I. P. Kosminskaya  
*Institute of the Physics of the Earth, USSR*

Dr. Marcus Langseth  
*Lamont-Doherty Geological Observatory*

Dr. Vince Renard  
*Centre Oceanologique de Bretagne*

Dr. G. Stober  
*Deminex, Dusseldorf*

Dr. Roland Von Huene  
*U.S. Geological Survey*

Dr. Joe S. Watkins  
*University of Texas*

Dr. Gleb Udintsev  
*P. P. Shirshov Institute of Oceanology, USSR*

Dr. Edward L. Winterer  
*Scripps Institution of Oceanography*

# Deep Sea Drilling Project SAMPLE DISTRIBUTION POLICY\*

Distribution of Deep Sea Drilling samples for investigation will be undertaken in order to (1) provide supplementary data to support GLOMAR CHALLENGER scientists in achieving the scientific objectives of their particular cruise, and in addition to serve as a mechanism for contributions to the *Initial Reports*; (2) provide individual investigators with materials that are stored with samples for reference and comparison purposes.

The National Science Foundation has established a Sample Distribution Panel to advise on the distribution of core materials. This panel is chosen in accordance with usual Foundation practices, in a manner that will assure advice in the various disciplines leading to a complete and adequate study of the cores and their contents. Funding for the proposed research must be secured separately by the investigator. It cannot be provided through the Deep Sea Drilling Project.

The Deep Sea Drilling Project's Curator is responsible for distributing the samples and controlling their quality, as well as preserving and conserving core material. He also is responsible for maintaining a record of all samples that have been distributed, shipboard and subsequent, indicating the recipient, and the nature of the proposed investigation. This information is made available to all investigators of DSDP materials as well as other interested researchers on request.

The distribution of samples is made directly from one of the two existing repositories, Lamont-Doherty Geological Observatory and Scripps Institution of Oceanography, by the Curator or his designated representative.

## 1. *Distribution of Samples for Research Leading to Contributions to Initial Reports*

Any investigator who wishes to contribute a paper to a given volume of the *Initial Reports* may write to the Chief Scientist, Deep Sea Drilling Project (A-031) Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A., requesting samples from a forthcoming cruise. Requests for a specific cruise should be received by the Chief Scientist two months in advance of the departure of the cruise in order to allow time for the review and consideration of all requests and to establish a suitable shipboard sampling program. The request should include a statement of the nature

of the study proposed, size and approximate number of samples required to complete the study, and any particular sampling technique or equipment that might be required. The requests will be reviewed by the Chief Scientist of the Project and the cruise co-chief scientists; approval will be given in accordance with the scientific requirements of the cruise as determined by the appropriate JODIES Advisory Panel(s). If approved, the requested samples will be taken, either by the shipboard party if the workload permits, or by the curatorial staff shortly following the return of the cores to the repository. Proposals must be of a scope to ensure that samples can be processed and a contribution completed in time for publication in the *Initial Reports*. Except for rare, specific instances involving ephemeral properties, sampling will not exceed one-quarter of the volume of core recovered, with no interval being depleted and one-half of all core being retained as an archive. Shipboard sampling shall not exceed approximately 100 igneous samples per investigator; in all cases co-chief scientists are requested to keep sampling to a minimum.

The co-chief scientists may elect to have special studies of selected core samples made by other investigators. In this event the names of these investigators and complete listings of all materials loaned or distributed must be forwarded, if possible, prior to the cruise or, as soon as possible following the cruise, to the Chief Scientist through the DSDP Staff Science Representative for that particular cruise. In such cases, all requirements of the Sample Distribution Policy shall also apply.

If a dispute arises or if a decision cannot be reached in the manner prescribed, the NSF Sample Distribution Panel will conduct the final arbitration.

Any publication of results other than in the *Initial Reports* within twelve (12) months of the completion of the cruise must be approved and authored by the whole shipboard party and, where appropriate, shore-based investigators. After twelve months, individual investigators may submit related papers for open publication provided they have submitted their contributions to the *Initial Reports*. Investigations not completed in time for inclusion in the *Initial Reports* for a specific cruise may not be published in other journals until final publication of that *Initial Report* for which it was intended. Notice of submission to other journals and a copy of the article should be sent to the DSDP Chief Science Editor.

\* Revised October 1976

2. *Distribution of Samples for Research leading to Publication other than in Initial Reports*

- A. Researchers intending to request samples for studies beyond the scope of the *Initial Reports* should first obtain sample request forms from the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A. On the forms the researcher is requested to specify the quantities and intervals of the core required, make a clear statement of the proposed research, state time required to complete and submit results for publication, specify the status of funding and the availability of equipment and space foreseen for the research.

In order to ensure that all requests for highly desirable but limited samples can be considered, approval of requests and distribution of samples will not be made prior to 2 months after publication of the Initial Core Descriptions (I.C.D.). ICD's are required to be published within 10 months following each cruise. The only exceptions to this policy will be for specific instances involving ephemeral properties. Requests for samples can be based on the Initial Core Descriptions, copies of which are on file at various institutions throughout the world. Copies of original core logs and data are kept on open file at DSDP and at the Repository at Lamont-Doherty Geological Observatory, Palisades, New York. Requests for samples from researchers in industrial laboratories will be handled in the same manner as those from academic organizations, with the same obligation to publish results promptly.

- B. (1) The DSDP Curator is authorized to distribute samples to 50ml per meter of core. Requests for volumes of material in excess of this amount will be referred to the NSF Sample Distribution Panel for review and approval. Experience has shown that most investigations can be accomplished with 10ml sized samples or less. All investigators are encouraged to be as judicious as possible with regard to sample size and, especially, frequency within any given core interval. The Curator will not automatically distribute any parts of the cores which appear to be in particularly high demand; requests for such parts will be referred to the Sample Distribution Panel for review. Requests for samples from

thin layers or important stratigraphic boundaries will also require Panel review.

(2) If investigators wish to study certain properties which may deteriorate prior to the normal availability of the samples, they may request that the normal waiting period not apply. All such requests must be reviewed by the curators and approved by the NSF Sample Distribution Panel.

- C. Samples will not be provided prior to assurance that funding for sample studies either exists or is not needed. However, neither formal approval of sample requests nor distribution of samples will be made until the appropriate time (Item A). If a sample request is dependent, either wholly or in part, on proposed funding, the Curator is prepared to provide to the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

- D. Investigators receiving samples are responsible for:

(1) publishing significant results; however contributions shall not be submitted for publication prior to 12 months following the termination of the appropriate leg;

(2) acknowledging, in publications, that samples were supplied through the assistance of the U.S. National Science Foundation and others as appropriate;

(3) submitting five (5) copies (for distribution to the Curator's file, the DSDP Repositories, the GLOMAR CHALLENGER's Library, and the National Science Foundation) of all reprints of published results to the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A.;

(4) returning, in good condition, the remainders of samples after termination of research, if requested by the Curator.

- E. Cores are made available at repositories for investigators to examine and to specify exact samples in such instances as may be necessary for the scientific purposes of the sampling, subject to the limitations of B (1 and 2) and D, above, with specific permission of the Curator or his delegate.



F. Shipboard-produced smear slides of sediments and thin sections of indurated sediments, igneous and metamorphic rocks, will be returned to the appropriate repository at the end of each cruise or at the publication of the *Initial Reports* for that cruise. These smear slides and thin sections will form a reference collection of the cores stored at each repository and may be viewed at the respective repositories as an aid in the selection of core samples.

G. The Deep Sea Drilling Project routinely processes by computer most of the quantitative data presented in the *Initial Reports*. Space limitations in the *Initial Reports* preclude the detailed presentation of all such data. However, copies of the computer readout are available for those who wish the data for further analysis or as an aid on selecting samples. A charge will be made to recover expenses in excess of \$50.00 incurred in filling requests.

### 3. *Other Records*

Magnetics, seismic reflection, downhole logging, and bathymetric data collected by the GLOMAR CHALLENGER will also be available for distribution at the same time samples become available.

Requests for data may be made to:

Associate Chief Scientist, Science Services  
Deep Sea Drilling Project (A-031)  
Scripps Institution of Oceanography  
University of California at San Diego  
La Jolla, California 92093

A charge will be made to recover the expenses in excess of \$50.00 in filling individual requests. If required, estimated charges can be furnished before the request is processed.

### 4. *Reference Centers*

As a separate and special category, samples will be distributed for the purpose of establishing up to five reference centers where paleontologic materials will be available for reference and comparison purposes. The first of these reference centers has been approved at Basel, Switzerland.

# CONTENTS

Chapter	Page	Chapter	Page
<b>ACKNOWLEDGMENT</b> .....	<b>xxvi</b>	11. THE BEDROCKS FROM THE BLACK SEA BOTTOM AND SOME FEATURES OF THE DEEP SEA BASIN STRUCTURE .....	469
<b>PART I: INTRODUCTION</b> .....	<b>1</b>	K. M. Shimkus, Ya. P. Malovitsky, and S. I. Shumenko	
1. INTRODUCTION AND EXPLANATORY NOTES, LEG 42B, DEEP SEA DRILLING PROJECT .....	3	12. STRATIGRAPHY AND SUGGESTED AGES OF BLACK SEA SEDIMENTS CORED DURING LEG 42B .....	483
Peter Supko, David A. Ross, and Yuri P. Neprochnov		Peter Stoffers, Egon T. Degens, and Egis S. Trimonis	
2. BLACK SEA STRATIGRAPHY .....	17	13. CORRELATION OF BLACK SEA SEQUENCES .....	489
David A. Ross		Kenneth J. Hsü	
<b>PART II: SITE REPORTS</b> .....	<b>27</b>	14. VARVE CHRONOLOGY: ESTIMATED RATES OF SEDIMENTATION IN THE BLACK SEA DEEP BASIN .....	499
3. SITE 379 .....	29	Egon T. Degens, Peter Stoffers, Stjepko Golubic, and Mike D. Dickman	
The Shipboard Scientific Party		15. STRATIGRAPHY OF THE LACUSTRINE SEDIMENTATION IN THE BLACK SEA ..	509
4. SITE 380 .....	119	Kenneth J. Hsü	
The Shipboard Scientific Party		<b>PART IV: INORGANIC GEOCHEMISTRY</b> ....	<b>525</b>
5. SITE 381 .....	293	16. MAJOR AND MINOR ELEMENT GEOCHEMISTRY OF SEDIMENTS FROM HOLE 379A, LEG 42B, DEEP SEA DRILLING PROJECT .....	527
The Shipboard Scientific Party		S. E. Calvert and C. H. Batchelor	
<b>PART III: SEDIMENTOLOGY, MINERALOGY,   AND STRATIGRAPHY</b> .....	<b>357</b>	17. GEOCHEMISTRY OF LATE CENOZOIC SEDIMENTS OF THE BLACK SEA, LEG 42B .....	543
6. BLACK SEA SEDIMENTARY FRAMEWORK .....	359	E. Emelyanov, A. P. Lisitzin, K. M. Shimkus, E. S. Trimonis, V. K. Lukashev, V. N. Luka- shin, A. Yu. Mitropolskiy, and M. P. Pilipchuk	
David A. Ross, Peter Stoffers, and E. S. Trimonis		18. A STUDY OF SEDIMENTATION AT DSDP HOLE 379A, BLACK SEA, BASED ON THE ISOTOPIC COMPOSITION OF STRONTIUM .....	607
7. MINERALOGY AND LITHOFACIES OF BLACK SEA SEDIMENTS, LEG 42B DEEP SEA DRILLING PROJECT .....	373	C. D. Nardone and G. Faure	
Peter Stoffers and German Müller		19. O <sup>18</sup> AND C <sup>13</sup> CONTENTS OF CARBONATES FROM DEEP SEA DRILLING SITES IN THE BLACK SEA ..	617
8. MINERAL COMPOSITION OF COARSE-SILT FRACTION OF THE BLACK SEA LATE CENOZOIC SEDIMENTS .....	413	W. G. Deuser, E. T. Degens, and P. Stoffers	
E. S. Trimonis, K. M. Shimkus, and D. A. Ross		20. SULFUR DISTRIBUTION IN HOLES 380 AND 380A OF LEG 42B .....	625
9. GRAIN-SIZE OF THE BLACK SEA SEDIMENTS, DSDP LEG 42B .....	427	Robert A. Berner and George R. Holdren, Jr.	
E. S. Trimonis and K. M. Shimkus			
10. X-RAY MINERALOGY STUDIES, LEG 42B .....	451		
E. S. Trimonis, Z. N. Gorbunova, A. S. Koz- hevnikov, V. V. Serova, and A. Ya. Shevchenko			

Chapter	Page	Chapter	Page
21. RADIOCARBON AND RADIOACTIVE ELEMENTS IN SEDIMENTS OF THE BLACK SEA . . . . .	627	31. EARLY AND INTERMEDIATE CHLOROPHYLL DIAGENESIS OF BLACK SEA SEDIMENTS: SITES 379, 380, AND 381 . . . . .	707
A. L. Devirts, O. P. Sobornov, E. I. Dobkina, and E. A. Filchenkova		E. W. Baker, S. E. Palmer, and W. Y. Huang	
22. DISTRIBUTION OF BROMINE, Cl/Br RELATIONSHIPS AND IODINE IN INTERSTITIAL WATER OF THE BLACK SEA, BASED ON DSDP LEG 42B . . . . .	631	32. GEOCHEMISTRY OF CARBON: DEEP SEA DRILLING PROJECT, LEGS 42A AND 42B . . . . .	717
O. V. Shishkina		J. G. Erdman and K. S. Schorno	
23. INTERSTITIAL WATERS OF BLACK SEA CORES . . . . .	637	33. PRELIMINARY ORGANIC GEOCHEMICAL STUDIES OF DSDP CORES, LEG 42B, BLACK SEA . . . . .	723
D. M. Schug		Vassil T. Vuchev, Chavdar P. Ivanov, Marija St. Kabakchieva, Ljuben L. Petrov, Rossitsa Zh. Stojanova, Dechko D. Stephanov, Dechka N. Djakova, and Lilija K. Petrova	
24. THE AGE OF TERRIGENOUS MINERALS OF THE BLACK SEA SEDIMENTS . . . . .	653	34. PETROLEUM-GENERATING POTENTIAL OF SEDIMENTS FROM THE EASTERN MEDITERRANEAN AND BLACK SEAS . . . . .	729
A. Ya. Krylov and E. S. Trimonis		J. W. Kendrick, A. Hood, and J. R. Castaño	
<b>PART V: ORGANIC GEOCHEMISTRY . . . . .</b>	<b>659</b>	35. HUMIC COMPOUNDS AND KEROGENS IN CORES FROM BLACK SEA SEDIMENTS, LEG 42B—HOLES 379A, B, AND 380A . . . . .	737
25. DISSOLVED GASES IN BLACK SEA SEDIMENTS . . . . .	661	A. Y. Huc, B. Durand, and J. C. Monin	
John M. Hunt and Jean K. Whelan		36. ORGANIC GEOCHEMISTRY OF TERRIGENOUS MUDS AND VARIOUS SHALES FROM THE BLACK SEA, DSDP LEG 42B . . . . .	749
26. CARBON ISOTOPE ANALYSES OF HEAD SPACE METHANE FROM SAMPLES OF LEG 42B, SITES 379, 380, AND 381 . . . . .	667	Bernd R. T. Simoneit	
E. Faber, M. Schmitt, and W. Stahl		37. PRELIMINARY RESULTS, ORGANIC GEOCHEMICAL INVESTIGATION OF BLACK SEA SEDIMENTS: DEEP SEA DRILLING PROJECT, LEG 42B . . . . .	755
27. C <sub>1</sub> HYDROCARBONS IN HOLES 389A, 380/380A, AND 381 . . . . .	673	Donald E. Anders, George E. Claypool, Sister Carlos M. Lubeck, and John M. Patterson	
Jean K. Whelan and John M. Hunt		38. MURAMIC ACID AS A MEASURE OF MICROBIAL BIOMASS IN BLACK SEA SEDIMENTS . . . . .	765
28. RESIDUAL HYDROCARBON GASES IN CANNED CORE MATERIAL FROM HOLES 379A AND 380A, LEG 42B . . . . .	679	John D. King and David C. White	
Richard D. McIver		<b>PART VI: BIOSTRATIGRAPHY . . . . .</b>	<b>771</b>
29. BITUMINOLOGICAL STUDIES OF THE SAMPLES FROM SITE 379 AND LABORATORY SIMULATION OF DISPERSED ORGANIC MATTER TRANSPORTATION . . . . .	683	39. INDIGENOUS AND REWORKED COCCOLITHS FROM THE BLACK SEA . . . . .	773
A. A. Geodekyan, G. F. Ul'mishek, T. G. Tchernova, V. I. Avilov, A. P. Bokovoy, Z. I. Verkhovskaya, and M. S. Fedorova		Stephan F. Percival, Jr.	
30. SUGARS, AMINO ACIDS, AND HYDROCARBONS IN BLACK SEA SEDIMENT FROM DSDP LEG 42B CORES . . . . .	697		
Kenneth Mopper, Walter Michaelis, Corrado Garrasi, and Egon T. Degens			

Chapter	Page	Chapter	Page
40. MICROPALaeONTOLOGICAL INVESTIGATIONS OF SEDIMENTS FROM SITES 379, 380, AND 381 OF LEG 42B . . . . .	783	50. QUATERNARY GEOMAGNETIC SECULAR VARIATION AND POLARITY REVERSAL RECORD AT DSDP SITES 379 AND 380, BLACK SEA . . . . .	1069
Musat Gheorghian		Ernest A. Hailwood and Norman Hamilton	
41. QUATERNARY THROUGH NEOGENE HISTORY OF THE BLACK SEA, DEDUCED FROM THE PALEOECOLOGY OF DIATOMS, SILICOFLAGELLATES, EBRIANS, AND CHRYSOMONADS . . . .	789	51. BLACK SEA: GEOLOGICAL SETTING AND RECENT DEPOSITS DISTRIBUTION FROM SEISMIC REFLECTION DATA . . .	1077
Hans-Joachim Schrader		J. Letouzey, R. Gonnard, L. Montadert, K. Kristchev, and A. Dorkel	
42. DIATOM UNITS AND THE PALEOGEOGRAPHY OF THE BLACK SEA IN THE LATE CENOZOIC (DSDP, LEG 42B) . . . . .	903	52. DOWNHOLE TEMPERATURE MEASUREMENTS AND HEAT FLOW DATA IN THE BLACK SEA—DSDP LEG 42B . . . . .	1085
Anastasia P. Jousé and Valentina V. Mukhina		A. J. Erickson and R. P. Von Herzen	
43. PALYNOLOGICAL STUDY OF SAMPLES FROM HOLES 379A, 380A, LEG 42B . . . . .	951	<b>PART VIII: PHYSICAL PROPERTIES . . . . . 1105</b>	
E. V. Koreneva and G. G. Kartashova		53. PHYSICAL AND MECHANICAL PROPERTIES OF THE BLACK SEA'S PLIOCENE-QUATERNARY SEDIMENTS (SITES 380 AND 381) . . . . .	1107
44. PALYNOLOGICAL ANALYSIS OF DSDP LEG 42B (1975) CORES FROM THE BLACK SEA . . . . .	993	P. N. Kuprin, F. A. Stcherbakov, A. S. Poljakov, V. G. Shlikov, M. P. Nesterova, A. J. Shevchenko, N. V. Turanskaya, and V. P. Kazakova	
Alfred Traverse		54. ELECTRICAL RESISTIVITY MEASUREMENTS OF SEDIMENTS FROM THE BLACK SEA AS A GUIDE TO DIFFUSIVE PROPERTIES . . . . .	1125
45. OSTRACODA FROM DSDP LEG 42B . . . .	1017	F. T. Manheim	
Radu Olteanu		55. TABULATED PHYSICAL PROPERTY DATA—LEG 42B . . . . .	1131
46. PRELIMINARY EXAMINATION OF THE OSTRACODES OF DSDP LEG 42B . . . . .	1039	The Shipboard Scientific Party	
R. H. Benson		<b>PART IX: SYNTHESSES OF THE BLACK SEA . . 1139</b>	
<b>PART VII: GEOPHYSICS . . . . . 1041</b>		56. BASIC FEATURES OF THE BLACK SEA LATE CENOZOIC HISTORY BASED ON RESULTS OF DEEP-SEA DRILLING, LEG 42B . . . . .	1141
47. BLACK SEA GEOPHYSICAL FRAMEWORK . . . . .	1043	M. V. Muratov, Y. P. Neprochnov, D. A. Ross, and E. S. Trimonis	
Yuri P. Neprochnov and David A. Ross		57. SUMMARY OF RESULTS OF BLACK SEA DRILLING . . . . .	1149
48. UNDERWAY GEOPHYSICAL MEASUREMENTS, LEG 42B . . . . .	1057	David A. Ross	
Yuri P. Neprochnov			
49. DETAILED SEISMIC STUDIES OF SEDIMENTARY STRUCTURE AROUND SITE 379, DSDP LEG 42B . . . . .	1065		
Y. P. Malovitsky, V. N. Moskalenko, and Y. D. Esvykov			

Chapter	Page	Chapter	Page
<b>PART X: MEDITERRANEAN GEOLOGY . . . .</b>			
58. SLIM HOLES DRILLED ON THE ALGERIAN SHELF . . . . .	1181	61. EXAMINATION OF SOME DSDP LEG 42A SAMPLES CONTAINING PTEROPODA . .	1223
P. F. Burollet, A. Said, and Ph. Trouve		L. Pastouret	
59. CYPRUS EVAPORITES . . . . .	1185	62. DINOFLAGELLATE CYSTS IN DEEP-SEA CORES FROM DSDP SITE 372, EAST MENORCA RISE . . . . .	1225
Theodoulos M. Pantazis		Domenico Corradini	
60. THE LATE TERTIARY OF THE COASTAL PLAIN AND CONTINENTAL SHELF OF ISRAEL AND ITS BEARING ON THE HISTORY OF THE EASTERN MEDITERRANEAN . . . . .	1195		
Gdaliahu Gvirtzman and Binyamin Buchbinder		<b>INDEX . . . . .</b>	1231

## ACKNOWLEDGMENTS

The scientists aboard D/V *Glomar Challenger* on DSDP Leg 42B in the Black Sea express their gratitude to Captain J. Clark and his crew for their admirable ability to keep the ship on station and for their cooperation in helping us achieve our drilling objectives. To Mr. M.D. Pennock, Cruise Operations Manager, we are indebted for his help in running the drilling program and advising us on how to continuously core the Black Sea sediments. We especially wish to thank the shipboard technicians aboard the cruise for their most conscientious and efficient handling of the numerous cores, and for documenting the large amount of data that were collected.

Several of the scientific programs that resulted from this expedition are due to special efforts by members of the scientific team. In particular, Frank Manheim and John Hunt were extremely helpful in coordinating the inorganic and organic geochemical program. Ken Hsü, Egon Degens, Egis Trimonis, and Yuri Neprochnov were of great help contacting colleagues throughout Europe and Asia and provided them with samples and information for their particular research studies.

We also wish to thank the members of the Mediterranean panel who shared our enthusiasm for drilling in the Black Sea and gave us the necessary support that we needed to make this operation a success.

A special thanks is due to John Usher who, because of the geographic distance between members who participated in this cruise, was extremely valuable in coordinating this volume. In addition, John Usher was responsible for much of the editorial work presented here. Peter Supko was also extremely helpful in the editorial work in spite of the vast distance between him and his co-workers.

The assistance of the Deep Sea Drilling Project staff in all phases of Leg 42B is gratefully appreciated.